

Filters/Input	Filter Coefficients (in gray boxes)										
F_3					1	2	1				
F_5				1	2	3	2	1			
F_7			1	2	3	4	3	2	1		
F_9		1	2	3	4	5	4	3	2	1	
F_11	1	2	3	4	5	6	5	4	3	2	1
Input data	D ₋₅	D ₋₄	D ₋₃	D ₋₂	D ₋₁	D ₀	D ₁	D ₂	D ₃	D ₄	D ₅

FIG. 2

Filters/Input	1D-filter outputs (sum of data in gray boxes in row)										
F_1						D ₀					
F_3					D ₁	2D ₀	D ₁				
F_5				D ₂	2D ₁	3D ₀	2D ₁	D ₂			
F_7			D ₃	2D ₂	3D ₁	4D ₀	3D ₁	2D ₂	D ₃		
F_9		D ₄	2D ₃	3D ₂	4D ₁	5D ₀	4D ₁	3D ₂	2D ₃	D ₄	
F_11	D ₅	2D ₄	3D ₃	4D ₂	5D ₁	6D ₀	5D ₁	4D ₂	3D ₃	2D ₄	D ₅
Input data	D ₋₅	D ₋₄	D ₋₃	D ₋₂	D ₋₁	D ₀	D ₁	D ₂	D ₃	D ₄	D ₅

FIG. 3

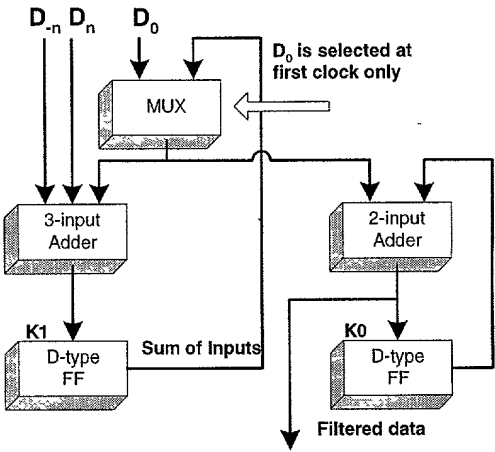


FIG. 6

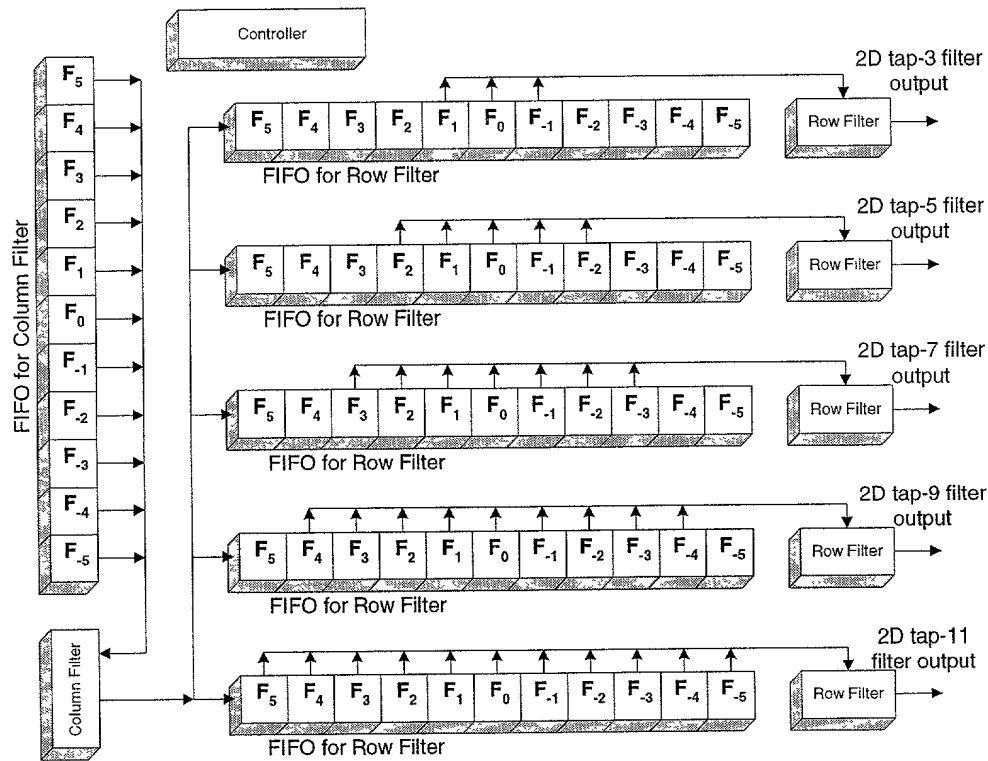


FIG. 5

FIFO Name	←← Data pushed this way										
FIFO 3	$K_{3,-5}$	$K_{3,-4}$	$K_{3,-3}$	$K_{3,-2}$	$K_{3,-1}$	$K_{3,0}$	$K_{3,1}$	$K_{3,2}$	$K_{3,3}$	$K_{3,4}$	$K_{3,5}$
FIFO 5	$K_{5,-5}$	$K_{5,-4}$	$K_{5,-3}$	$K_{5,-2}$	$K_{5,-1}$	$K_{5,0}$	$K_{5,1}$	$K_{5,2}$	$K_{5,3}$	$K_{5,4}$	$K_{5,5}$
FIFO 7	$K_{7,-5}$	$K_{7,-4}$	$K_{7,-3}$	$K_{7,-2}$	$K_{7,-1}$	$K_{7,0}$	$K_{7,1}$	$K_{7,2}$	$K_{7,3}$	$K_{7,4}$	$K_{7,5}$
FIFO 9	$K_{9,-5}$	$K_{9,-4}$	$K_{9,-3}$	$K_{9,-2}$	$K_{9,-1}$	$K_{9,0}$	$K_{9,1}$	$K_{9,2}$	$K_{9,3}$	$K_{9,4}$	$K_{9,5}$
FIFO 11	$K_{11,-5}$	$K_{11,-4}$	$K_{11,-3}$	$K_{11,-2}$	$K_{11,-1}$	$K_{11,0}$	$K_{11,1}$	$K_{11,2}$	$K_{11,3}$	$K_{11,4}$	$K_{11,5}$

FIG. 4

Implementations		Traditional 2D-filter Bank		Progressive 2D-filter Bank	
		General	M = 5	General	M = 5
Software	# of additions	$2M^2 + 2M$	60	$3M(M + 3)/2$	60
	# of multiplications	$2M^2 + 4M$	70	0	0
	# of computations	$4M^2 + 6M$	130	$3M(M + 3)/2$	60
Hardware	# of adders	2M	10	$2(M + 1)$	12
	# of multipliers	2M	10	0	0
	# of clocks **	$(4M + 1)$	21	$(M + 1)$	6

1. Assume that the adder or multiplier finishes one computation by only one clock .
2. A MAC contains one adder and one multiplier.

FIG. 7

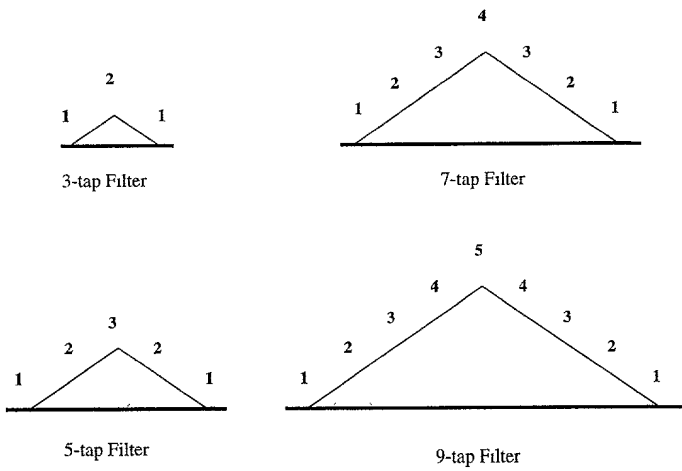


FIG. 1